



State of Ohio Environmental Protection Agency

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George V. Voinovich
Governor

October 17, 1997

RE: DOE FEMP
MSL 531-0297
HAMILTON COUNTY
COMMENTS - TH-232 ISSUE

Mr. Johnny Reising
U.S. Department of Energy, Fernald Area Office
P.O. Box 538705
Cincinnati, OH 45253-8705

Dear Mr. Reising:

The Ohio Environmental Protection Agency have reviewed your letter "Response to the U.S. Environmental Protection Agency and Ohio Environmental Protection Agency Comments on the Proposed Use of Thorium-232 Final Remediation Level as a Basis for Assessing Attainment of All Final Remediation Levels in the Thorium Series", dated August 29, 1997. The Ohio EPA offers the following proposal to determine the concentrations of thorium-232, radium-228 and thorium-228.

1. The referenced letter indicates that five gamma photons are commonly used to quantify thorium-232, radium-228 and thorium-228. It would be inappropriate to use the two actinium-228 peaks to quantify thorium-228 since actinium-228 precedes thorium-228 in the decay series.
2. The use of the lead-212 peak (0.239 MeV) should not be used due to potential interferences from radium-224 (0.241 MeV) and lead-214 (0.242 MeV) photons. Lead-214 will be present from the uranium-238 decay chain.
3. To quantify thorium-232 and radium-228 the two actinium-228 photons should be used:

Actinium-228	0.911, 0.969 MeV
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Equilibrium conditions can be verified through the evaluation of the other photons in the decay chain, namely:

Bismuth-212	0.727 MeV
Thallium-208(36%)	0.583, 0.511, 2.615 MeV

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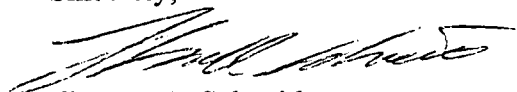
4. To quantify thorium-228 the following photons should be evaluated:

Bismuth-212	0.727 MeV
Thallium-208(36%)	0.583, 0.511, 2.615 MeV

All four peaks should be used to determine the concentration of Th-228, using the error weighted averaging technique proposed in the above referenced letter.

If you have any questions, please contact me.

Sincerely,



Thomas A. Schneider
Fernald Project Manager
Office of Federal Facilities Oversight

cc: Jim Saric, U.S.EPA
Terry Hagen, FDF
Ruth Vandegrift, ODH
Francie Barker, TT EM Inc.
Manager, TPSS/DERR,CO
Dave Ward, HSI GeoTrans